

ML Space Lead

The Air Force Research Laboratory's Materials and Manufacturing Directorate Space Lead serves as the central point of contact for materials, processing, and manufacturing activities for space, launch, and missile applications for the U.S. Air Force.

The ML Space Lead also provides representation, coordination and leadership at all levels ensuring that leading edge materials, processes and manufacturing technology are being worked for the Air Force's space customers. The ML Space Lead infrastructure consists of dedicated engineers and contract technical support, a materials technical team and collocated materials engineers at Kirtland AFB and Los Angeles AFB. The office is responsible for defining ML program requirements and recommended investment strategy for space, launch and missile materials technology. This process includes: reviewing and assessing materials needed and requirements across a broad range of space customers, reviewing and assessing industry and other government lab technology developments and assessing opportunities or requirements in new materials technology areas. The ML Space Lead is responsible for providing and coordinating the requirements to ML Core Technology Areas and ensuring transition paths are established. The office also coordinates national forums such as the National Space and Missile Materials Symposium, and Joint DoD-NASA-Industry Working Groups for IHPRT Materials and TPS.

Contact

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Air Force Research Laboratory

(AFRL) is a full-spectrum laboratory responsible for planning and executing the Air Force's entire science and technology program. The AFRL mission is leading the discovery, development, and integration of affordable warfighting technologies for our aerospace forces. AFRL is organized along technology disciplines into nine technology directorates plus the Air Force Office of Scientific Research. Each directorate performs, procures and synthesizes basic research, exploratory technology development, and advanced technology development within its area of responsibility.

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Materials & Manufacturing Directorate (ML)

is headquartered at Wright-Patterson AFB, with an additional research facility at Tyndall AFB, Fla., develops materials, processes and advanced manufacturing technologies for aircraft, spacecraft, missiles, rockets and ground-based systems and their structural, electronic and optical components. Their research includes revolutionary nano-scale and biotechnologies, as well as nonstructural materials such as coatings, fluids and greases. Air Force product centers, logistics centers and operating commands rely on the directorate's expertise in metallic and nonmetallic structural materials, nondestructive inspection, materials used in aerospace propulsion systems, sensor materials, laser-hardened materials, systems support and advanced manufacturing methods to solve system, expeditionary deployment and operational challenges.

For more information, contact the
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Call: (937) 255-6469 (DSN 785-6469)
or visit: www.afrl.af.mil

SPACE & MISSILE MATERIALS

**Materials & Manufacturing Directorate
Air Force Research Laboratory**



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Structures

- Antennas, Trusses, Optics
- Thin Films, Deployables, Mechanisms
- Joints, Bonding, Foams, Substrates

Thermal Management

- Radiators, Doubles, Interfaces
- Coatings and Space Qualification
- Thermal-Structural Solutions

Propulsion

- Light-Weight Tanks, Processing, Compatibility
- Ion Thruster Chamber and Grid Materials
- Propellant Catalysts

Spacecraft Lubricants

- Micro-electromechanical Systems (MEMS) Tribology
- Long Life Lubricants, Wear Resistant Coatings for Moving Mechanical Assemblies

Power

- Advanced Solar Cell Processing and Cost
- Polymer Wires
- Photonics, Wide Bandgap Materials
- Superconducting Materials

Electronics/Communication

- Electro-Optical Materials
- Non-Linear Optical Materials
- Semi-conductors
- Radiation Hardening

Sensors

- Hyperspectral and Infrared Detectors
- Processing/Defect Reduction
- Microwave Device Materials

Protection

- Electro-Optical Limiters
- Rugate Filters
- Agile Protection

Access to Space; Missiles . . . Advanced Materials

Propulsion - IHPRPT

- Integrated High Payoff Rocket Propulsion Technology (IHPRPT) is a key enabler for materials and processing technology
- ML has over 20 contracted projects focusing on advancements in materials and processing technology for liquid cryogenic and solid boosters, tactical propulsion and in-space thrusters

Thermal Protection Systems - TPS

- Strategies for re-entry vehicles, reusable launch vehicles and hypersonic aircraft.
- Investing in research to development, demonstrate and transition Gamma TiAl, Ceramic Matrix Composites, Carbon-Carbon and novel hybrid approaches

Tanks and Structures

- Pursuing continued development an demonstration of advanced lightweight cryogenic tank materials
- Demonstrating material solutions that enable structural/conformal tanks and designs that integrate thermal protection systems

Biomimetics

- Using fundamental advancements in molecular biology to produce and deposit novel materials and develop new architectures for existing materials
- Unique synthesis of biological and synthetic materials are possible
- Inherent abilities to build materials from the molecular-level up to the macroscopic - "bottom-up" approach to materials science

Nanotechnology

- Using cutting-edge nanoscience technologies
- Exploring interfacial phenomena and quantum confinement

Space Experiments and Testing

- Materials on the International Space Station Experiment (MISSE) program
- Space Combined Effects Primary Test and Research (SCEPTRE) program
- LHMEI - Unique lab for using high temperature materials effects, thermal simulation and space simulation

